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**Bunk beds and high beds — Safety  
requirements and tests —**

**Part 1:  
Safety requirements**

*Lits superposés et lits hauts — Exigences de sécurité et essais —  
Partie 1: Exigences de sécurité*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by ISO/TC 136, *Furniture*.

This second edition cancels and replaces the first edition (ISO 9098-1:1994), which has been technically revised.

The main changes are as follows:

- modification of the title;
- specification of the scope;
- terms and definitions of high bed, tread, completely bound opening, partially bound opening, upper bed, means of access, and handrail added;
- requirements for the materials improved;
- requirements for vertically protruding parts added;
- requirements for accessible holes, gaps and openings added;
- requirements for bed base(s) given in more detail;
- requirements for safety barriers around beds added;
- requirements for means of access added;
- requirements for shear and squeeze points added;
- requirements for platform and stairs added;
- requirements for all other accessible holes, gaps or openings added;
- requirements for strength of means of access: Attachment, deflection and strength added;

- requirements for strength of frame and fastenings given in more detail;
- requirements for the stability given in more detail;
- requirements for the instructions for use given in more detail;
- requirements for the marking given in more detail;
- requirements for the purchase information added;
- addition of informative [Annex A](#) and informative [Annex B](#).

A list of all parts in the ISO 9098 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

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# Bunk beds and high beds — Safety requirements and tests —

## Part 1: Safety requirements

### 1 Scope

This document specifies requirements for the safety, strength and durability of bunk beds and high beds for domestic and non-domestic use.

It applies to bunk beds and high beds with an internal length greater than 1 400 mm and a maximum bed base width of 1 200 mm, and with the upper surface of a bed base of 600 mm or more above the floor.

Requirements for other products incorporated in a bunk bed/high bed, for example a table or storage furniture, are not included in this document.

This document does not apply to bunk beds and high beds used for special purposes, including but not limited to prison, the military and fire brigades.

### 2 Normative reference

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 9098-2:2023,<sup>1)</sup> *Bunk beds and high beds — Safety requirements and tests — Part 2: Test methods*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

#### 3.1

##### **bunk bed**

set of components that can be assembled as two beds, one above the other, where the upper surface of any bed base is 600 mm or more above floor

#### 3.2

##### **high bed**

set of components that can be assembled as a bed, where the upper surface of the top bed base is 600 mm or more above the floor, irrespective of the use to which the space below is put

1) Under preparation. Stage at the time of publication: ISO/FDIS 9098-2:2022.

**3.3**

**bed end structure**

upright unit at the head and foot of the bed to which the *side rails* (3.6) are attached

**3.4**

**bed base**

support structure for a mattress

**3.5**

**safety barrier**

component intended to prevent an occupant from falling out of the *upper bed* (3.10) or the *high bed* (3.2)

**3.6**

**side rail**

longitudinal members attached to the *bed end structure* (3.3) by which the *bed base* (3.4) can be supported

**3.7**

**tread**

structure intended as a foothold

**3.8**

**completely bound opening**

opening that is continuously surrounded

**3.9**

**partially bound opening**

opening that is partially surrounded

**3.10**

**upper bed**

bed for which the upper surface of its bed base is 600 mm or more above the floor

**3.11**

**means of access**

ladder(s) or stairs to facilitate access to and egress from the upper bed or an access platform

**3.12**

**handrail**

rail or another component intended to assist the user to balance

## 4 Safety requirements

### 4.1 Construction

#### 4.1.1 General

When the bed is fully assembled, accessible edges and corners shall be rounded or chamfered and free from burrs or sharp edges.

There shall be no open-ended tubes.

All assembly and pilot holes shall be made by the manufacturer.

There shall be no clothes hooks or similar items more than 600 mm from the floor.

If the lowest points of the vertically protruding parts are above 600 mm from the floor, they shall either:

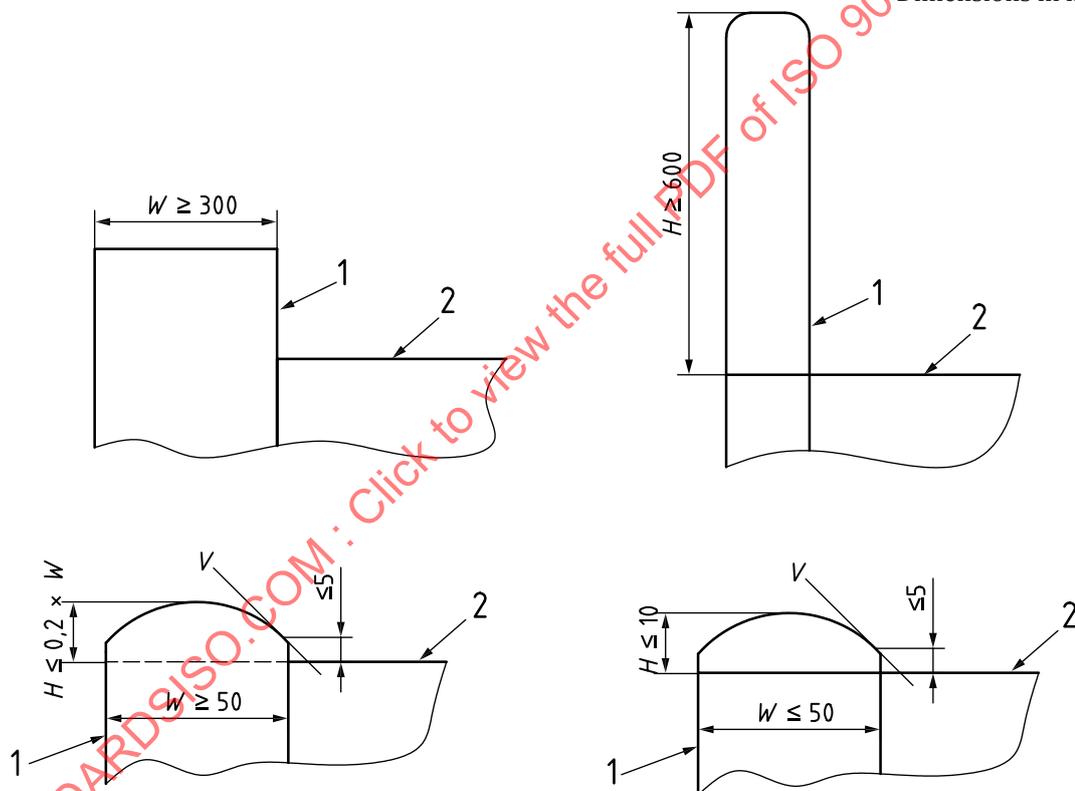
- a) have an uninterrupted minimum horizontal dimension of 300 mm without any other vertical protrusion (see [Figure 1 a](#)), or

- b) have an uninterrupted vertical dimension of at least 600 mm measured from the highest adjacent part (see [Figure 1](#) b), or
- c) where the largest dimension is 50 mm or more (see [Figure 1](#)), have a maximum height at which a line, drawn at 45° touches it, of not more than 5 mm above at least one adjacent/adjoining horizontal component; the maximum vertical protrusion above that component shall not exceed 20 % of the largest horizontal dimension of parts (see [Figure 1](#) c), or
- d) where the largest dimension is less than 50 mm, have a maximum height at which a line, drawn at 45° touches it, of not more than 5 mm above at least one adjacent/adjoining horizontal component; the maximum vertical protrusion above that component shall not exceed 10 mm (see [Figure 1](#) d).

It shall not be possible to dismantle the bed or its components without the use of a tool.

The dimensional requirements apply both before and after testing without re-tightening.

Dimensions in millimetres



**Key**

- 1 vertically protruding part
- 2 highest adjacent part
- w width of protruding part
- H height of protruding part
- v 45° angle to the horizontal

**Figure 1 — Examples of a vertically protruding part**

## 4.1.2 Accessible holes, gaps and openings

### 4.1.2.1 General

Accessible completely bound openings in rigid material shall be with a diameter/width less than 7 mm or greater than 12 mm, unless the depth is less than 10 mm or unless the shape assessment probe enters when tested according to 6.3.1 of ISO 9098-2:2023.

Additionally, accessible completely bound openings in safety barriers, bed bases and treads, shall fulfil the requirements specified in the respective clauses, i.e. [4.1.3](#), [4.1.4](#) and [4.1.5](#).

### 4.1.2.2 Head entrapment on the outside of the bunk bed/high bed

The following requirements apply only to openings, where the lowest part is  $\geq 600$  mm from the floor.

Partially bound opening, V and irregular shaped openings shall be constructed so that:

- a) portion B of the template shall not enter the opening to the full thickness of the template according to 6.3.2 of ISO 9098-2:2023; or
- b) the apex of portion A of the template shall contact the base of the opening when tested according to 6.3.2 of ISO 9098-2:2023.

## 4.1.3 Bed base(s)

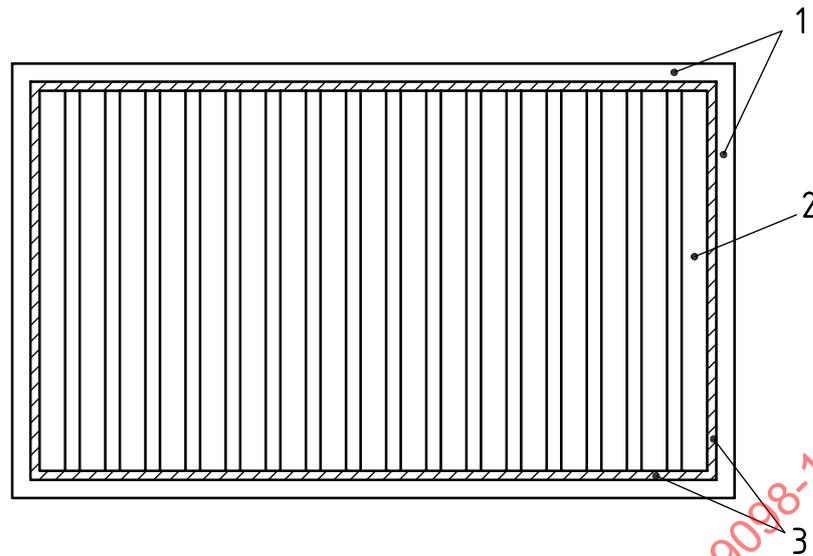
### 4.1.3.1 Free space between bed bases in bunk beds

For bunk beds, the distance between the upper surface of the lower bed base and any part of the underside of the upper bed base shall be at least 750 mm.

### 4.1.3.2 Gaps and openings (see [A.2](#))

Gaps adjacent to the inner surfaces of the side and end rails (see [Figure 2](#)) shall be less than 25 mm.

For beds where the bed base is an independent component, which is fitted between the side and end rails, the gap between the base and the side and end rails, shall be less than 25 mm when tested according to 6.3.1 of ISO 9098-2:2023.



#### Key

- 1 bed frame (side and end rails)
- 2 bed base (slat)
- 3 gaps between bed base and bed frame

**Figure 2 — Illustration of zone in which 25 mm gaps are not permitted**

For beds, where the side and/or end rails are an integral part of the bed base, e.g. where slats are mounted directly into the side and/or end rails, or where a slatted bed base is supported by a load bearing component fixed to the side and/or end rails, all gaps directly adjacent to the side and end rails shall be less than 25 mm. These designs shall be tested according to ISO 9098-2:2023, 6.3.1.

All gaps between bed base components, (e.g. slats, mesh) shall be less than 75 mm when measured in accordance with ISO 9098-2:2023, 6.3.1.

#### 4.1.3.3 Ventilation (see [A.3](#))

The bed base(s) shall allow ventilation.

This requirement is fulfilled if there is a minimum ventilation area of 35 cm<sup>2</sup> distributed across the bed base (e.g. 8 holes with a diameter of 24 mm in a solid bed base, gaps between slats). The ventilation shall be in more than one location. The openings shall fulfil the requirements in [4.1.2](#).

#### 4.1.3.4 Structural integrity

The bed shall have a means (e.g. fastening) of preventing the side rails from bending outwards. This requirement is fulfilled if the bed base or its elements do not break or become detached when tested with the horizontal outwards force according to ISO 9098-2:2023, 6.4.2.1.

When tested in accordance with 6.4.2.2, 6.4.2.3 and 6.4.2.4 of ISO 9098-2:2023, the bed base(s) and/or its elements shall not break or become detached.

The forces, height and the number of cycles shall be as specified in [Annex B](#), [Tables B.2](#) to [B.4](#).

4.1.4 Safety barriers around upper beds

4.1.4.1 General requirements

Any upper bed shall be equipped with a continuous safety barrier all around the bed with the following exceptions to facilitate access and egress:

- a single opening in the barrier leading directly to the means of access is permitted on the long side of the bed or
- a single opening in the barrier leading directly to an access platform conforming to 4.1.5.5 is permitted on any side of the bed.

When the bed is intended for use only in non-domestic settings, the structure of the building can act as a safety barrier, provided that the bed is fastened to it according to the manufacturer’s instructions.

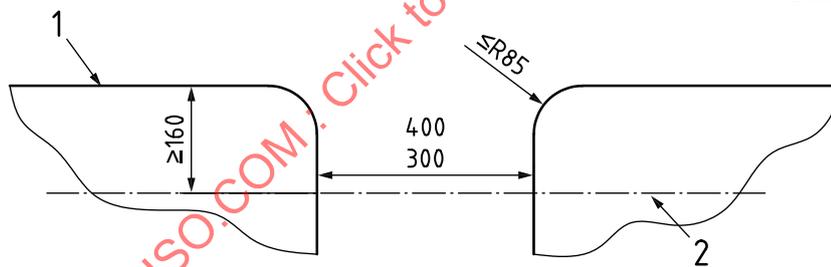
4.1.4.2 Dimensional requirements

The distance between the upper edge of the safety barriers and the upper surface of the bed base shall be at least 260 mm.

The top of the mattress shall be at least 160 mm below the upper edge of the safety barriers. The maximum thickness of the mattress shall be permanently marked (see 5.1 b)). The measurement shall be made from the maximum mattress thickness mark (see Figure 3) to the upper edge of the safety barriers.

With the exception of the upper corners of the safety barrier, which may end in a maximum radius of 85 mm, the opening for access in the safety barrier shall have a width between 300 mm and 400 mm from the maximum mattress thickness mark (see 5.1 b)) to 160 mm above it (see Figure 3).

Dimension in millimetres

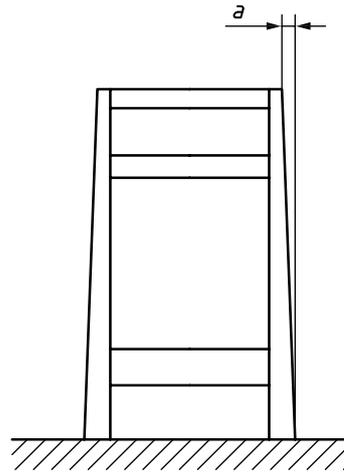


Key

- 1 safety barrier
- 2 maximum mattress thickness mark

Figure 3 — Opening in the top safety barrier - Example

With the exception of the means of access, the horizontal distance between the outside of the top safety barrier and the vertical projection of the outermost point of the legs/posts/panels (a), shall not exceed 55 mm or shall be more than 230 mm (see Figure 4).

**Key**

$a$  horizontal distance between the outside of the top safety barrier and the vertical projection of the outermost point of the legs/posts/panels

**Figure 4 — Distance between the top safety barrier and the vertical projection**

With the exception of the opening for access, the safety barrier shall be designed so that in at least one direction the clear space between two adjacent retaining elements (e.g. bands, filler bars) is either less than 7 mm or is more than 60 mm and less than 75 mm when tested in accordance with ISO 9098-2:2023, 6.3.1.

#### 4.1.4.3 Gaps and openings

Gaps between the ends of the safety barrier and the bed end structures shall not exceed 7 mm, when tested in accordance with ISO 9098-2:2023, 6.3.1.

#### 4.1.4.4 Structural integrity

Safety barriers shall not become damaged or loosened when tested according to in accordance with ISO 9098-2:2023, 6.4.3.

The forces shall be as specified in [Annex B, Table B.2](#).

#### 4.1.5 Means of access

##### 4.1.5.1 General

The upper bed shall have at least one separate means of access.

If there is no opening for access in the safety barrier, the distance from the top tread or upper surface of the access platform to the top of the safety barrier shall not be more than 500 mm.

The bed frame of any upper bed is not considered to be a tread.

There shall be no components, e.g. drawers, shelves, flaps and doors, that interfere with the usable area of the treads.

**4.1.5.2 Gaps and openings**

When tested in accordance with 6.3.1 of ISO 9098-2:2023, the gap between the means of access and any part of the bed frame shall be:

- a) less than 7 mm; or
- b) more than 12 mm but less than 25 mm; or
- c) more than 60 mm but less than 75 mm; or
- d) more than 200 mm.

**4.1.5.3 Ladders**

The ladder shall either be vertical or shall be inclined towards the upper bed or the access platform.

If there is an opening for access in the safety barrier, the distance between the top tread and the point of access shall not be more than 500 mm.

The distance from the floor to the upper surface of the first tread shall not exceed 400 mm.

The distance between the upper surfaces of two successive treads shall be  $(250 \pm 50)$  mm.

The distance between the upper surfaces of the treads shall be equal with a tolerance of  $\pm 5$  mm.

The treads shall be horizontal in width within  $\pm 3^\circ$ .

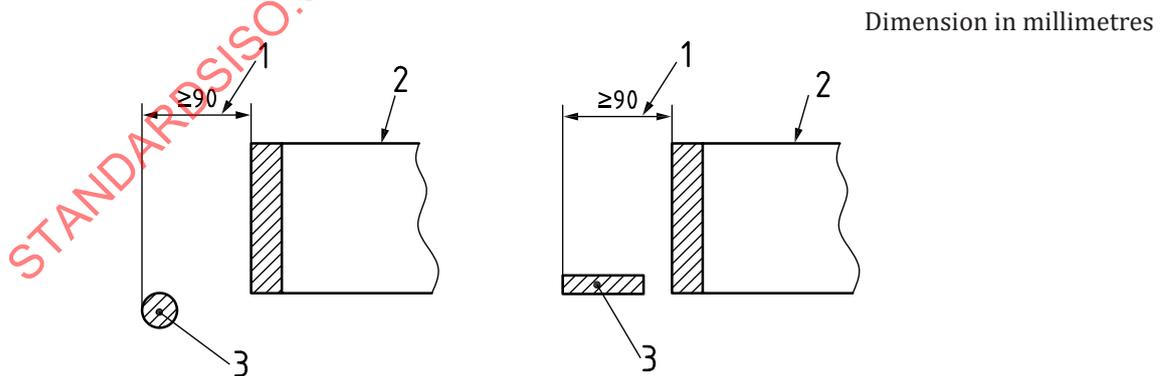
The clear distance between two successive treads shall be at least 200 mm.

The usable width of the treads shall be at least 300 mm.

The front edges of all treads shall lie on a straight line within  $\pm 20$  mm.

With the exception of any upper bed, the bed frame can be used as a tread as long as the requirements in 4.1.5.1 and 4.1.5.2 are fulfilled.

The effective step depth shall be measured without the mattress in place and shall be at least 90 mm (see Figure 5).



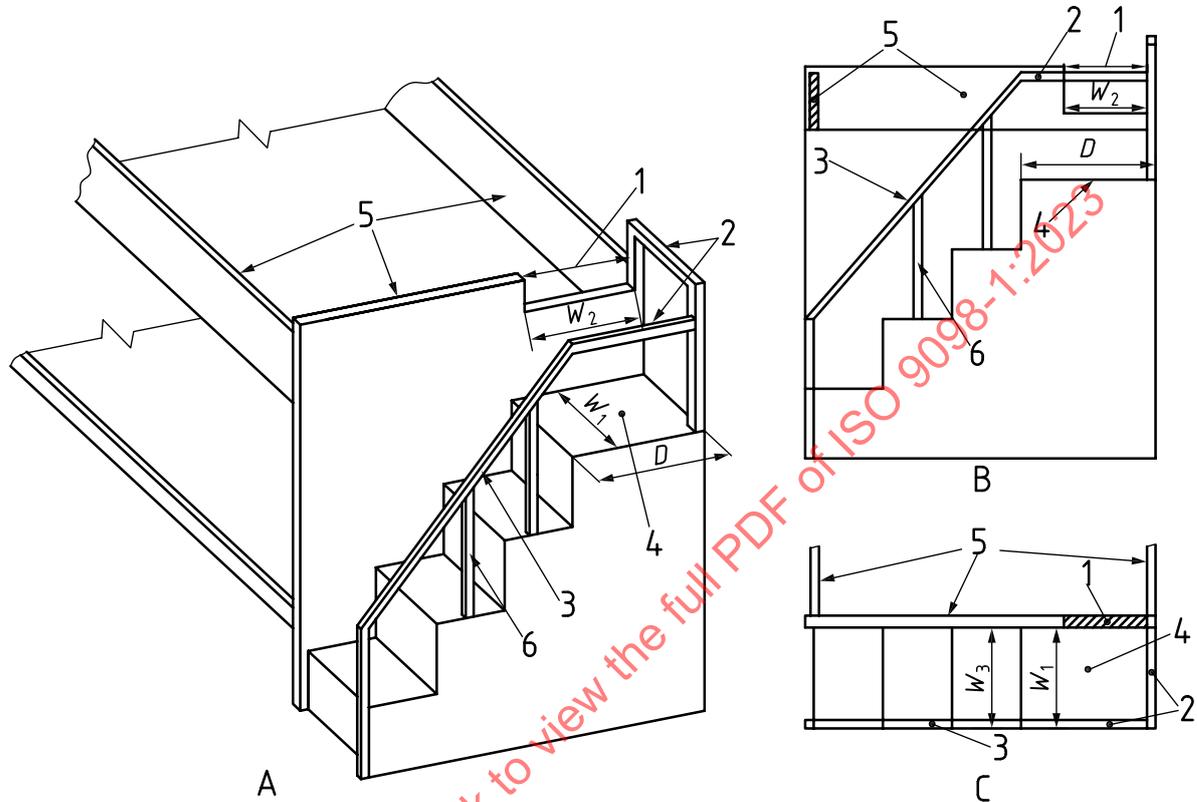
- Key**
- 1 step depth
  - 2 frame part
  - 3 tread

**Figure 5 — Gaps and step depth - Example of construction**

#### 4.1.5.4 Stairs and handrails

##### 4.1.5.4.1 General requirements

The uppermost tread of stairs is considered to be the access platform (see [Figure 6](#)).



##### Key

A	overall view	1	opening in safety barrier around bed
B	end view of stairs and platform	2	platform barrier
C	top view of stairs and platform	3	handrail
$D$	depth of the platform	4	access platform
$W_1$	width of the platform	5	safety barrier around bed
$W_2$	width of the opening for access	6	handrail support
$W_3$	width of the usable tread		

**Figure 6 — Example of upper bed with access platform and stairs**

A handrail shall be provided on the side of the stairs not adjacent to the bed. If the stairs are not adjacent to the bed, there shall be handrails on both sides.

The handrail shall commence at the lowest tread and continue to the safety barrier around the access platform or the bed.

The front of each tread shall be vertically above, or extended beyond, the back of each tread below, so that, when viewed from above, no gap is visible.

##### 4.1.5.4.2 Dimensional requirements

The handrail shall be not less than 600 mm and not more than 850 mm above the standing surface.

The width of the handrail shall not exceed 60 mm.

The distance between the upper surfaces of two successive treads shall be  $(250 \pm 50)$  mm.

The distance between the upper surfaces of the treads shall be equal with a tolerance of  $\pm 5$  mm.

The treads shall be horizontal in both depth and width within  $\pm 3^\circ$ .

The usable width of the treads shall be at least 450 mm.

The front edges of all treads shall lie on a straight line within  $\pm 20$  mm.

The minimum depth of each tread shall be  $> 200$  mm.

#### 4.1.5.4.3 Structural integrity

When tested according to clause 6.4.5.5 of ISO 9098-2:2023, the handrails shall not break or detach.

The forces shall be as specified in [Annex B, Table B.2](#).

#### 4.1.5.5 Additional requirements for access platforms

##### 4.1.5.5.1 General requirements

The access platform shall have a minimum width ( $W_1$ ) of at least the usable tread width ( $W_3$ ) and the depth ( $D$ ) shall be at least the width of the opening for access ( $W_2$ ) to the sleeping surface (see [Figure 6](#)).

The access platform shall be vertically in line with the opening for access to the sleeping surface and it shall not be less than the width of the opening (see [Figure 6 A](#)).

With the exception of the side attached to the bed and the means of access to the access platform, it shall be fitted with continuous barriers.

The direction of use of the means of access shall be parallel to the opening from the access platform to the sleeping surface (see [Figure 6 A](#)).

The access platform shall be permanently attached to the bunk bed/high bed structure. It shall not be possible to use the bunk bed/high bed with the access platform disconnected.

##### 4.1.5.5.2 Dimensional requirements

If there is an opening for access in the safety barrier, the vertical distance between the upper surface of the access platform and the maximum mattress thickness mark shall not be more than 500 mm.

The height of the platform barriers shall be at least 600 mm above the upper surface of the access platform.

##### 4.1.5.5.3 Gaps and openings

The gaps in the access platform barriers shall conform with the requirements of [4.1.7](#) (a) and (b).

##### 4.1.5.5.4 Structural integrity

The access platform barriers shall not become damaged or loosened when tested with horizontal outward static load and downwards static load in accordance with ISO 9098-2:2023, 6.4.6.1.

The forces shall be as specified in [Annex B, Table B.2](#).

The access platform frame and structural fastenings shall not become damaged or loosened when tested with downward static load and impact test in accordance with ISO 9098-2:2023, 6.4.6.2 and 6.4.6.3.

The forces, height and the number of cycles shall be as specified in [Annex B, Table B.2](#) and [Table B.4](#).

#### 4.1.6 Shear and squeeze points

##### 4.1.6.1 General

Drawers, doors and flaps are excluded from this requirement.

##### 4.1.6.2 Additional requirements for access platforms

If [4.1.6.3](#) or [4.1.6.4](#) are not applicable, shear and squeeze points that are created only when setting up or folding are permitted.

##### 4.1.6.3 Shear and squeeze points under the influence of powered mechanisms

Where powered or spring-loaded mechanisms are used, the distance between two accessible parts moving relative to each other shall always be greater than 18 mm or smaller than 7 mm.

##### 4.1.6.4 Shear and squeeze points during use

Accessible shear and squeeze points shall be more than 18 mm unless they are always less than 7 mm. This test shall be performed before and during the last load application in accordance with relevant tests in ISO 9098-2:2023, 6.4, 6.5 and 6.6.

#### 4.1.7 All other accessible holes, gaps or openings

All other accessible holes, gaps or openings not covered in [4.1.2](#) to [4.1.6](#) shall be either:

- a) more than 12 mm but less than 25 mm, when tested according to ISO 9098-2:2023, 6.3.1.; or
- b) more than 60 mm but less than 75 mm, when tested according to ISO 9098-2:2023, 6.3.1.; or
- c) more than 200 mm.

#### 4.2 Strength of means of access: Attachment, deflection and strength

The bed shall be provided with a means of access which shall not break, become detached or deform permanently by more than 5 mm when tested in accordance with ISO 9098-2:2023, 6.4.5.

The forces, height and the number of cycles shall be as specified in [Annex B, Table B.2](#) to [Table B.4](#).

#### 4.3 Durability of frame and fastenings

Regardless of the manufacturer's instructions the durability test according to ISO 9098-2:2023, 6.4.4 is applicable to all beds which can be free standing.

The force and the number of cycles shall be as specified in [Annex B, Table B.3](#).

When tested, the frame and structural fastenings shall not be damaged or malfunction; nor shall any part detach.

#### 4.4 Stability (see [A.5](#))

Regardless of the manufacturer's instructions, the stability test is applicable to all beds which can be free standing.

When tested in accordance with 6.5 of ISO 9098-2:2023, the bed shall not overturn.

If the product overturns, the product shall be supplied with wall attachment device and visibly and permanently marked in accordance with [5.1 e](#)).

The force shall be as specified in [Annex B, Table B.1](#).

#### 4.5 Fastening of the upper bed to the lower bed

For bunk beds, the upper bed shall be connected to the lower bed in such a manner that it does not disconnect when tested in accordance with ISO 9098-2:2023, 6.6.

The force shall be as specified in [Annex B, Table B.2](#).

### 5 Product information

#### 5.1 Marking

All beds which claim compliance with this standard shall be clearly and permanently marked with the following information:

- a) name and/or trademark of the manufacturer or importer;
- b) maximum thickness of the mattress to be used with the bed. This can be in the form of text, a line on the bed at the correct height, or by other means;
- c) number and year of this document;
- d) either the text or a pictogram visible when in use as follows:

**Text on upper bed:** This bed is not suitable for children under six years;

**Pictogram** at least 25 mm × 25 mm: see [Figure 7](#)

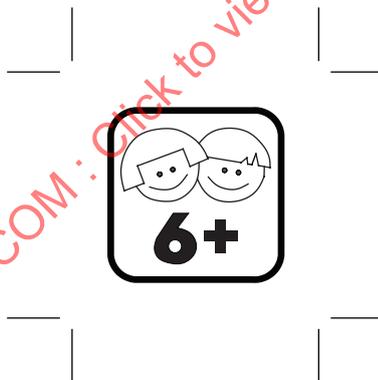


Figure 7 — Example of pictogram

- e) if the product is required to be attached to a structure of the building or fails the requirement in [4.4](#), the marking: **WARNING** "This product must be attached to a wall or building structure".

The marking shall be visible when all mattresses and bedding are installed.

The marking shall be permanent when tested in accordance with ISO 9098-2:2023.

#### 5.2 Instructions for use

All beds which claim compliance with this standard shall be provided with instructions for use in the official language(s) of the country where the bed is sold. The instructions shall be headed:

##### **IMPORTANT — READ CAREFULLY – RETAIN FOR FUTURE REFERENCE**

The instructions for use shall include at least the following information:

The word **WARNING** can be given at the top of a list of warnings. Alternative wording is permitted provided the meaning is complete and identical.

- a) for bunk beds: **WARNING** "The upper bed are not suitable for children under six years due to the risk of injury from falls"; for high beds: **WARNING** "The bed is not suitable for children under six years due to the risk of injury from falls";
- b) **WARNING** "Never have more than one person on the upper bed.";
- c) **WARNING** "Bunk beds (high beds) can present a serious risk of injury from strangulation if not used correctly. Never attach or hang items to any part of the bunk bed (high bed) that are not designed to be used with the bed, for example, but not limited to ropes, strings, cords, hooks, belts and bags";
- d) **WARNING** "Children can become trapped between the bed and the wall, a roof pitch, the ceiling, adjoining pieces of furniture (e.g. cupboards) and the like. To avoid risk of serious injury the distance between the top safety barrier and the adjoining structure shall not exceed 75 mm or shall be more than 230 mm";
- e) **WARNING** Do not use the bunk bed (high bed) if any structural part is broken or missing; if the product is fitted with a platform, the following warning shall be provided: **WARNING** "Always ensure the platform and ladder(stairs) are permanently attached to the bunk bed before use";
- f) if the product is required to be attached to a structure of the building, the following warning shall be provided: **WARNING** "This product must be attached to a wall or building structure";
- g) always follow the manufacturer's instructions;
- h) a statement that ventilation of the room is necessary in order to keep the humidity low and to prevent mould in and around the bed;
- i) all bunk beds/high beds capable of being assembled or disassembled shall include assembly instructions including a list of the parts supplied and details of any tools required to assemble the bed;
- j) instructions regarding positioning and connection of the means of access;
- k) the recommended size of the mattress(es) (e.g. length, width) and the maximum thickness of the mattress (see [4.1.4.2](#)) as well as information regarding the mattress;
- l) a statement to check regularly that all assembly fastenings are properly tightened;
- m) the number and year of this ISO Standard;
- n) name or trademark of the manufacturer or importer and the respective address.

### 5.3 Purchase information

Purchase information shall be available at the point of sale and shall contain the following:

- a) name and/or trademark of the manufacturer or importer and the respective address;
- b) a statement or pictogram to inform that the high/upper bed is not suitable for children under six years (see [Figure 7](#));
- c) the recommended size of the mattresses(es) (e.g. length, width and maximum thickness);
- d) if the product is required to be attached to a structure of the building or fails the requirement in [4.4](#), the following warning:

**WARNING — "This product must be attached to a wall or building structure".**

NOTE If the product is sold through the Internet, the point of sale is the web page where the product is sold.